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**Abstract of GB1051841**

1,051,841. Fire-extinguisher. G. H. J. ELKINS and B. LANGFORD. Jan. 8, 1964 [Jan. 8, 1963], No. 930/63. Heading ASA. A fire-extinguisher comprises a source of inert gas (e.g. CO<sub>2</sub>) at a pressure above atmospheric, a container for a liquid foam-former and an outlet nozzle, the pressure of the gas being used to expel the liquid from the container and spray it on to a perforate screen attached to the nozzle. The gas source may be a cylinder of compressed gas or a chemical generator and means are provided for cutting off the supply of liquid so that the device may be used as an inert gas-type extinguisher.

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# PATENT SPECIFICATION

DRAWINGS ATTACHED

1,051,841

1,051,841



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## Improvements in and relating to fire fighting equipment.

### COMPLETE SPECIFICATION

We, GEOFFREY HENRY JAMES ELKINS and BRIAN LANGFORD, both British subjects, both of the Fire Research Station, Boreham Wood, Elstree, Hertfordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :-

This invention relates to fire fighting equipment and in particular to a self-contained fire extinguisher to produce high expansion foam filled with an inert gas. If desired the equipment may also be made so that it can produce a stream of inert gas for fire fighting when this is preferred to foam.

Fire fighting equipment according to the invention comprises a source of inert gas at a pressure above atmospheric, a container for a liquid to form the liquid phase of a foam comprising the inert gas, and an outlet nozzle, the pressure of the inert gas being used to expel the liquid from the container and spray it on to a perforate screen attached to the nozzle when the extinguisher is in use.

Whilst the source of inert gas will normally be a high pressure cylinder containing the gas under high pressure and most probably in a liquefied state, a generator of any well known kind which will produce an inert gas by means of a chemical reaction may be provided, if this is preferred. The inert gas which will most usually be carbon-dioxide is stored or produced under pressure and when the extinguisher is in use part of the gas is used to pressurise the separate container filled with a suitable foaming producing liquid. By this means the liquid is expelled from the container and sprayed on to a perforate screen. The bulk of the inert gas passes under pressure through the perforate screen so producing foam which can be directed from the nozzle of the extinguisher towards the seat of the fire. The pressure which is applied to the liquid container and the size of the pipe which dips into the liquid in this container may be adjusted relative to the rate of the main flow of the inert gas to produce a foam of the desired expansion. The extinguisher will normally be used to produce a high expansion foam for example having an expansion ratio of 500-1000/1.

If upon an occasion it is desired to fight a fire with a jet of inert gas rather than with foam a valve may be provided so that the feed of liquid to the perforate screen in the nozzle can be cut off. In this case it is also desirable that the perforate screen should be readily removable so that it does not diffuse the jet of inert gas.

To this end the perforate screen may be hingedly secured in position and may be movable about its hinges to such a position where it will not interfere with the jet of inert gas. Alternatively the screen may be carried upon an annulus which is a push fit over a part of the nozzle. The perforate screen may be of any convenient suitable construction. Thus it may be a perforate metal screen or grille or a mesh of natural or synthetic fibre or an open weave textile fabric. Whilst the screen will normally be disposed substantially perpendicular to the direction of passage of inert gas through the nozzle and may be followed by an extension of the nozzle to direct the stream of foam, it may be preferred under certain circumstances to provide a screen in the form of an open-ended bag. In this case a larger volume of foam will be produced but it will have no appreciable component of velocity in any particular direction and it will be necessary to flow it on to a fire which is to be extinguished.

The foam forming liquid may be of any conventional kind. It may be for example a concentrated aqueous solution of a detergent. One advantage of an aqueous detergent foam is that after the fire has been extinguished the foam breaks down easily to give an aqueous film which can easily be cleaned

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up and which is not likely to cause any substantial damage to anything with which it comes into contact.

Whilst the device will normally be provided in the form of self-contained extinguisher which can easily be man-handled it is also suitable for extinguishers of a size which can conveniently be carried upon a small hand-pulled trolley. In the latter case it will usually be desirable that the containers and the nozzle should be interconnected by a length of hose.

In order that the invention may be clearly understood an embodiment thereof is illustrated in the accompanying diagrammatic drawing which shows a schematic arrangement of a fire extinguisher according to the invention.

A source of compressed inert gas which may conveniently be a cylinder 11 of carbon dioxide is connected through a valve 12 to the end 13 of a nozzle 14 and also to a liquid container 15. When the valve is opened the flow of gas under pressure forces liquid 16 out of the container 15 through the tube 17 to a spray 18 which disperses the liquid on to a screen 19 of net or open mesh textile fabric.

The liquid 16 contains a foaming agent and may for example be an aqueous solution of a detergent in water, such as a one per cent solution. The flow of gas through the nozzle 14 from the end 13 forms at the screen 19 a high expansion foam which passes out of the open end of the nozzle 14.

A valve 20 serves to control the pressure which is applied to the container 15 and so control the rate of feed of solution 16 through the spray 18. Alternatively if the valve 20 is closed a stream of carbon dioxide gas will pass out through the open end of the nozzle 14 to provide an alternative extinguishing medium.

Whilst in the embodiment of the invention illustrated pressure gauges 21 and 22 are provided to enable the relative pressures of the gas feed to the nozzle 14 and of the gas feed to the liquid container 15 to be adjusted, it will be appreciated that in a commercial extinguisher according to the invention these would not usually be provided. Instead the valves would be arranged so that when they were turned to the on position the relative pressures of the two gas feeds would be at optimum values.

#### 55 WHAT WE CLAIM IS :—

1. Fire fighting equipment comprising a source of inert gas at a pressure above atmospheric, a container for a liquid to form the liquid phase of a foam comprising the inert

gas, and an outlet nozzle, the pressure of the inert gas being used to expel the liquid from the container and spray it on to a perforate screen attached to the nozzle when the extinguisher is in use.

2. Apparatus according to claim 1 in which the source of inert gas is a cylinder containing the gas under high pressure.

3. Apparatus according to claim 1 in which the source of inert gas is a generator which will produce a gas by means of a chemical reaction.

4. Apparatus according to any one of claims 1, 2 and 3 in which the inert gas is carbon dioxide.

5. Apparatus according to any preceding claim in which the rate at which the liquid is sprayed on to the perforate screen is controllable to control the degree of expansion of the foam produced.

6. Apparatus according to any of the preceding claims in which the feed of liquid to the perforate screen can be cut off whilst the extinguisher is in use to allow it to be used as an inert gas extinguisher.

7. Apparatus according to claim 6 in which the screen can be readily removed from its operative position when the extinguisher is being used to supply inert gas.

8. Apparatus according to any of the preceding claims in which the perforate screen is a mesh or grille of metal wire or natural or synthetic filaments or a perforate screen of metal or natural or synthetic material or an open weave textile fabric.

9. Apparatus according to any of the preceding claims in which the foam forming liquid is an aqueous solution of a detergent.

10. Fire fighting equipment substantially as hereinbefore specifically described with reference to the accompanying diagrammatic drawing.

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*This drawing is a reproduction of  
the Original on a reduced scale.*

